



## SEQUENCE LISTING

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WANG, PINGER

<120> TRANSGENIC PLANTS PRODUCING A PAP II PROTEIN

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<140> 09/721,047

<141> 2000-11-22

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<151> 1999-05-21

<150> 60/086,374

<151> 1998-05-22

<160> 21

<170> PatentIn Ver. 3.3

<210> 1

<211> 1379

<212> DNA

<213> *Phytolacca americana*

<220>

<221> CDS

<222> (225)..(1163)

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ggggggagtga aacctcagct gctaaaaaaa cgttgtaaga aaaaaagaaa gttgtgagtt 180

aactacaggg cgaaagtatt ggaactagct agtaggaagg gaag atg aag tcg atg 236  
Met Lys Ser Met  
1

ctt gtg gtg aca ata tca ata tgg ctc att ctt gca cca act tca act 284  
Leu Val Val Thr Ile Ser Ile Trp Leu Ile Leu Ala Pro Thr Ser Thr  
5 10 15 20

tgg gct gtg aat aca atc atc tac aat gtt gga agt acc acc att agc 332  
Trp Ala Val Asn Thr Ile Ile Tyr Asn Val Gly Ser Thr Thr Ile Ser  
25 30 35

aaa tac gcc act ttt ctg aat gat ctt cgt aat gaa gcg aaa gat cca 380  
Lys Tyr Ala Thr Phe Leu Asn Asp Leu Arg Asn Glu Ala Lys Asp Pro  
40 45 50

agt tta aaa tgc tat gga ata cca atg ctg ccc aat aca aat aca aat 428  
Ser Leu Lys Cys Tyr Gly Ile Pro Met Leu Pro Asn Thr Asn Thr Asn  
55 60 65

cca aag tac gtg ttg gtt gag ctc caa ggt tca aat aaa aaa acc atc	476
Pro Lys Tyr Val Leu Val Glu Leu Gln Gly Ser Asn Lys Lys Thr Ile	
70 75 80	
aca cta atg ctg aga cga aac aat ttg tat gtg atg ggt tat tct gat	524
Thr Leu Met Leu Arg Arg Asn Asn Leu Tyr Val Met Gly Tyr Ser Asp	
85 90 95 100	
ccc ttt gaa acc aat aaa tgt cgt tac cat atc ttt aat gat atc tca	572
Pro Phe Glu Thr Asn Lys Cys Arg Tyr His Ile Phe Asn Asp Ile Ser	
105 110 115	
ggg act gaa cgc caa gat gta gag act act ctt tgc cca aat gcc aat	620
Gly Thr Glu Arg Gln Asp Val Glu Thr Thr Leu Cys Pro Asn Ala Asn	
120 125 130	
tct cgt gtt agt aaa aac ata aac ttt gat agt cga tat cca aca ttg	668
Ser Arg Val Ser Lys Asn Ile Asn Phe Asp Ser Arg Tyr Pro Thr Leu	
135 140 145	
gaa tca aaa gcg gga gta aaa tca aga agt cag gtc caa ctg gga att	716
Glu Ser Lys Ala Gly Val Lys Ser Arg Ser Gln Val Gln Leu Gly Ile	
150 155 160	
caa ata ctc gac agt aat att gga aag att tct gga gtg atg tca ttc	764
Gln Ile Leu Asp Ser Asn Ile Gly Lys Ile Ser Gly Val Met Ser Phe	
165 170 175 180	
act gag aaa acc gaa gcc gaa ttc cta ttg gta gcc ata caa atg gta	812
Thr Glu Lys Thr Glu Ala Glu Phe Leu Leu Val Ala Ile Gln Met Val	
185 190 195	
tca gag gca gca aga ttc aag tac ata gag aat cag gtg aaa act aat	860
Ser Glu Ala Ala Arg Phe Lys Tyr Ile Glu Asn Gln Val Lys Thr Asn	
200 205 210	
ttt aac aga gca ttc aac cct aat ccc aaa gta ctt aat ttg caa gag	908
Phe Asn Arg Ala Phe Asn Pro Asn Pro Lys Val Leu Asn Leu Gln Glu	
215 220 225	
aca tgg ggt aag att tca aca gca att cat gat gcc aag aat gga gtt	956
Thr Trp Gly Lys Ile Ser Thr Ala Ile His Asp Ala Lys Asn Gly Val	
230 235 240	
tta ccc aaa cct ctc gag cta gtg gat gcc agt ggt gcc aag tgg ata	1004
Leu Pro Lys Pro Leu Glu Leu Val Asp Ala Ser Gly Ala Lys Trp Ile	
245 250 255 260	
gtg ttg aga gtg gat gaa atc aag cct gat gta gca ctc tta aac tac	1052
Val Leu Arg Val Asp Glu Ile Lys Pro Asp Val Ala Leu Leu Asn Tyr	
265 270 275	
gtt ggt ggg agc tgt cag aca act tat aac caa aat gcc atg ttt cct	1100
Val Gly Gly Ser Cys Gln Thr Thr Tyr Asn Gln Asn Ala Met Phe Pro	
280 285 290	

caa ctt ata atg tct act tat tat aat tac atg gtt aat ctt ggt gat 1148  
 Gln Leu Ile Met Ser Thr Tyr Tyr Asn Tyr Met Val Asn Leu Gly Asp  
 295 300 305

cta ttt gaa gga ttc tgatcataaa cataataagg agtatatata tattactcca 1203  
 Leu Phe Glu Gly Phe  
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actatattat aaagcttaaa taagaggccg tgtaattag tacttggtgc cttttgcttt 1263

atggtgttgt ttattatgcc ttgtatgctt gtaatattat ctagagaaca agatgtactg 1323

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<211> 313

<212> PRT

<213> *Phytolacca americana*

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Thr Thr Ile Ser Lys Tyr Ala Thr Phe Leu Asn Asp Leu Arg Asn Glu  
 35 40 45

Ala Lys Asp Pro Ser Leu Lys Cys Tyr Gly Ile Pro Met Leu Pro Asn  
 50 55 60

Thr Asn Thr Asn Pro Lys Tyr Val Leu Val Glu Leu Gln Gly Ser Asn  
 65 70 75 80

Lys Lys Thr Ile Thr Leu Met Leu Arg Arg Asn Asn Leu Tyr Val Met  
 85 90 95

Gly Tyr Ser Asp Pro Phe Glu Thr Asn Lys Cys Arg Tyr His Ile Phe  
 100 105 110

Asn Asp Ile Ser Gly Thr Glu Arg Gln Asp Val Glu Thr Thr Leu Cys  
 115 120 125

Pro Asn Ala Asn Ser Arg Val Ser Lys Asn Ile Asn Phe Asp Ser Arg  
 130 135 140

Tyr Pro Thr Leu Glu Ser Lys Ala Gly Val Lys Ser Arg Ser Gln Val  
 145 150 155 160

Gln Leu Gly Ile Gln Ile Leu Asp Ser Asn Ile Gly Lys Ile Ser Gly  
 165 170 175

Val Met Ser Phe Thr Glu Lys Thr Glu Ala Glu Phe Leu Leu Val Ala  
 180 185 190

Ile Gln Met Val Ser Glu Ala Ala Arg Phe Lys Tyr Ile Glu Asn Gln  
 195 200 205

Val Lys Thr Asn Phe Asn Arg Ala Phe Asn Pro Asn Pro Lys Val Leu  
 210 215 220

Asn Leu Gln Glu Thr Trp Gly Lys Ile Ser Thr Ala Ile His Asp Ala  
 225 230 235 240

Lys Asn Gly Val Leu Pro Lys Pro Leu Glu Leu Val Asp Ala Ser Gly  
 245 250 255

Ala Lys Trp Ile Val Leu Arg Val Asp Glu Ile Lys Pro Asp Val Ala  
 260 265 270

Leu Leu Asn Tyr Val Gly Gly Ser Cys Gln Thr Thr Tyr Asn Gln Asn  
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Ala Met Phe Pro Gln Leu Ile Met Ser Thr Tyr Tyr Asn Tyr Met Val  
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 <213> *Phytolacca americana*

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ctg atg ctt aca cca cca gct tct tca aac ata gtg ttt gac gtt gag 96  
 Leu Met Leu Thr Pro Pro Ala Ser Ser Asn Ile Val Phe Asp Val Glu  
 -5 -1 1 5

aat gcc aca cca gaa acc tac tct aat ttt ctg act agt ttg cga gaa 144  
 Asn Ala Thr Pro Glu Thr Tyr Ser Asn Phe Leu Thr Ser Leu Arg Glu  
 10 15 20

gct gtg aaa gac aag aaa ttg aca tgc cat gga atg ata atg gcc aca 192  
 Ala Val Lys Asp Lys Lys Leu Thr Cys His Gly Met Ile Met Ala Thr  
 25 30 35

acc ctc act gaa caa ccc aag tat gtg ttg gtt gac ctc aaa ttc gga	240
Thr Leu Thr Glu Gln Pro Lys Tyr Val Leu Val Asp Leu Lys Phe Gly	
40 45 50 55	
tct gga aca ttc aca tta gca atc aga agg gga aac tta tat ttg gag	288
Ser Gly Thr Phe Thr Leu Ala Ile Arg Arg Gly Asn Leu Tyr Leu Glu	
60 65 70	
ggc tat tct gac att tac aat gga aaa tgt cgt tat cgg atc ttc aag	336
Gly Tyr Ser Asp Ile Tyr Asn Gly Lys Cys Arg Tyr Arg Ile Phe Lys	
75 80 85	
gat tca gaa tcc gat gcc caa gag acc gtt tgc ccc ggg gac aaa agc	384
Asp Ser Glu Ser Asp Ala Gln Glu Thr Val Cys Pro Gly Asp Lys Ser	
90 95 100	
aag cct ggc act cag aat aat atc ccc tat gaa aag agt tac aaa ggg	432
Lys Pro Gly Thr Gln Asn Asn Ile Pro Tyr Glu Lys Ser Tyr Lys Gly	
105 110 115	
atg gaa tca aag ggt ggg gct aga act aaa tta ggg tta gga aag ata	480
Met Glu Ser Lys Gly Glu Ala Arg Thr Lys Leu Gly Leu Gly Lys Ile	
120 125 130 135	
aca ctc aag agt cga atg ggt aaa atc tac ggc aag gat gca acg gat	528
Thr Leu Lys Ser Arg Met Gly Lys Ile Tyr Gly Lys Asp Ala Thr Asp	
140 145 150	
cag aag cag tat caa aaa aat gag gct gaa ttt ctt ctt ata gcc gtt	576
Gln Lys Gln Tyr Gln Lys Asn Glu Ala Glu Phe Leu Leu Ile Ala Val	
155 160 165	
caa atg gtt act gag gca tca agg ttc aaa tac att gag aac aaa gtg	624
Gln Met Val Thr Glu Ala Ser Arg Phe Lys Tyr Ile Glu Asn Lys Val	
170 175 180	
aag gct aaa ttt gat gat gcc aat ggg tat cag cca gat cct aaa gct	672
Lys Ala Lys Phe Asp Asp Ala Asn Gly Tyr Gln Pro Asp Pro Lys Ala	
185 190 195	
att tcc cta gag aaa aat tgg gac agt gtt tct aag gtc att gca aaa	720
Ile Ser Leu Glu Lys Asn Trp Asp Ser Val Ser Lys Val Ile Ala Lys	
200 205 210 215	
gtt ggc acc tcc ggt gat agt act gtt act tta cct gga gac cta aaa	768
Val Gly Thr Ser Gly Asp Ser Thr Val Thr Leu Pro Gly Asp Leu Lys	
220 225 230	
gat gag aat aat aaa cct tgg act acg gcc acc atg aac gac ctt aag	816
Asp Glu Asn Asn Lys Pro Trp Thr Thr Ala Thr Met Asn Asp Leu Lys	
235 240 245	
aac gac att atg gca ctc cta acc cac gtt act tgc aag gtt aaa agt	864
Asn Asp Ile Met Ala Leu Leu Thr His Val Thr Cys Lys Val Lys Ser	
250 255 260	

tcc atg ttc cct gaa att atg tcc tat tat tat agg act agt att agt 912  
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<210> 4  
 <211> 310  
 <212> PRT  
 <213> *Phytolacca americana*

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 Asn Ala Thr Pro Glu Thr Tyr Ser Asn Phe Leu Thr Ser Leu Arg Glu  
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 Ala Val Lys Asp Lys Lys Leu Thr Cys His Gly Met Ile Met Ala Thr  
 25 30 35  
 Thr Leu Thr Glu Gln Pro Lys Tyr Val Leu Val Asp Leu Lys Phe Gly  
 40 45 50 55  
 Ser Gly Thr Phe Thr Leu Ala Ile Arg Arg Gly Asn Leu Tyr Leu Glu  
 60 65 70  
 Gly Tyr Ser Asp Ile Tyr Asn Gly Lys Cys Arg Tyr Arg Ile Phe Lys  
 75 80 85  
 Asp Ser Glu Ser Asp Ala Gln Glu Thr Val Cys Pro Gly Asp Lys Ser  
 90 95 100  
 Lys Pro Gly Thr Gln Asn Asn Ile Pro Tyr Glu Lys Ser Tyr Lys Gly  
 105 110 115  
 Met Glu Ser Lys Gly Gly Ala Arg Thr Lys Leu Gly Leu Gly Lys Ile  
 120 125 130 135  
 Thr Leu Lys Ser Arg Met Gly Lys Ile Tyr Gly Lys Asp Ala Thr Asp  
 140 145 150  
 Gln Lys Gln Tyr Gln Lys Asn Glu Ala Glu Phe Leu Leu Ile Ala Val  
 155 160 165  
 Gln Met Val Thr Glu Ala Ser Arg Phe Lys Tyr Ile Glu Asn Lys Val  
 170 175 180  
 Lys Ala Lys Phe Asp Asp Ala Asn Gly Tyr Gln Pro Asp Pro Lys Ala  
 185 190 195

Ile Ser Leu Glu Lys Asn Trp Asp Ser Val Ser Lys Val Ile Ala Lys  
 200 205 210 215  
 Val Gly Thr Ser Gly Asp Ser Thr Val Thr Leu Pro Gly Asp Leu Lys  
 220 225 230  
 Asp Glu Asn Asn Lys Pro Trp Thr Thr Ala Thr Met Asn Asp Leu Lys  
 235 240 245  
 Asn Asp Ile Met Ala Leu Leu Thr His Val Thr Cys Lys Val Lys Ser  
 250 255 260  
 Ser Met Phe Pro Glu Ile Met Ser Tyr Tyr Tyr Arg Thr Ser Ile Ser  
 265 270 275  
 Asn Leu Gly Glu Phe Glu  
 280 285

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<220>  
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 Oligonucleotide

<400> 5  
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<210> 6  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 6  
 tttggaggac tattctgac 19

<210> 7  
 <211> 19  
 <212> DNA  
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<220>  
 <223> Description of Artificial Sequence: Primer

<400> 7  
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<210> 8  
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 <212> DNA  
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<220>  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

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<210> 10  
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<210> 11  
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 <223> Description of Artificial Sequence: Primer

<400> 11  
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 <223> Description of Artificial Sequence: Primer

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<210> 13  
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<210> 14  
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<210> 17  
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<220>  
 <223> Description of Artificial Sequence: Primer

<400> 17  
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<210> 18  
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<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

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<210> 19  
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<212> DNA  
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<223> Description of Artificial Sequence: Primer

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<213> *Phytolacca americana*

<220>  
<221> CDS  
<222> (1)..(855)

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ttt ctg act agt ttg cga gaa gct gtg aaa gac aag aaa ttg aca tgc 96  
Phe Leu Thr Ser Leu Arg Glu Ala Val Lys Asp Lys Lys Leu Thr Cys  
20 25 30  
cat gga atg ata atg gcc aca acc ctc act gaa caa ccc aag tat gtg 144  
His Gly Met Ile Met Ala Thr Thr Leu Thr Glu Gln Pro Lys Tyr Val  
35 40 45  
ttg gtt gac ctc aaa ttc gga tct gga aca ttc aca tta gca atc aga 192  
Leu Val Asp Leu Lys Phe Gly Ser Gly Thr Phe Thr Leu Ala Ile Arg  
50 55 60  
agg gga aac tta tat ttg gag ggc tat tct gac att tac aat gga aaa 240  
Arg Gly Asn Leu Tyr Leu Glu Gly Tyr Ser Asp Ile Tyr Asn Gly Lys  
65 70 75 80

tgt cgt tat cgg atc ttc aag gat tca gaa tcc gat gcc caa gag acc	288
Cys Arg Tyr Arg Ile Phe Lys Asp Ser Glu Ser Asp Ala Gln Glu Thr	
85 90 95	
gtt tgc ccc ggg gac aaa agc aag cct ggc act cag aat aat atc ccc	336
Val Cys Pro Gly Asp Lys Ser Lys Pro Gly Thr Gln Asn Asn Ile Pro	
100 105 110	
tat gaa aag agt tac aaa ggg atg gaa tca aag ggt ggg gct aga act	384
Tyr Glu Lys Ser Tyr Lys Gly Met Glu Ser Lys Gly Gly Ala Arg Thr	
115 120 125	
aaa tta ggg tta gga aag ata aca ctc aag agt cga atg ggt aaa atc	432
Lys Leu Gly Leu Gly Lys Ile Thr Leu Lys Ser Arg Met Gly Lys Ile	
130 135 140	
tac ggc aag gat gca acg gat cag aag cag tat caa aaa aat gag gct	480
Tyr Gly Lys Asp Ala Thr Asp Gln Lys Gln Tyr Gln Lys Asn Glu Ala	
145 150 155 160	
gaa ttt ctt ctt ata gcc gtt caa atg gtt act gag gca tca agg ttc	528
Glu Phe Leu Leu Ile Ala Val Gln Met Val Thr Glu Ala Ser Arg Phe	
165 170 175	
aaa tac att gag aac aaa gtg aag gct aaa ttt gat gat gcc aat ggg	576
Lys Tyr Ile Glu Asn Lys Val Lys Ala Lys Phe Asp Asp Ala Asn Gly	
180 185 190	
tat cag cca gat cct aaa gct att tcc cta gag aaa aat tgg gac agt	624
Tyr Gln Pro Asp Pro Lys Ala Ile Ser Leu Glu Lys Asn Trp Asp Ser	
195 200 205	
gtt tct aag gtc att gca aaa gtt ggc acc tcc ggt gat agt act gtt	672
Val Ser Lys Val Ile Ala Lys Val Gly Thr Ser Gly Asp Ser Thr Val	
210 215 220	
act tta cct gga gac cta aaa gat gag aat aat aaa cct tgg act acg	720
Thr Leu Pro Gly Asp Leu Lys Asp Glu Asn Asn Lys Pro Trp Thr Thr	
225 230 235 240	
gcc acc atg aac gac ctt aag aac gac att atg gca ctc cta acc cac	768
Ala Thr Met Asn Asp Leu Lys Asn Asp Ile Met Ala Leu Leu Thr His	
245 250 255	
gtt act tgc aag gtt aaa agt tcc atg ttc cct gaa att atg tcc tat	816
Val Thr Cys Lys Val Lys Ser Ser Met Phe Pro Glu Ile Met Ser Tyr	
260 265 270	
tat tat agg act agt att agt aac ctt ggt gaa ttc gag	855
Tyr Tyr Arg Thr Ser Ile Ser Asn Leu Gly Glu Phe Glu	
275 280 285	

&lt;210&gt; 21

&lt;211&gt; 285

&lt;212&gt; PRT

&lt;213&gt; Phytolacca americana

&lt;400&gt; 21

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			20					25					30		
His	Gly	Met	Ile	Met	Ala	Thr	Thr	Leu	Thr	Glu	Gln	Pro	Lys	Tyr	Val
		35					40					45			
Leu	Val	Asp	Leu	Lys	Phe	Gly	Ser	Gly	Thr	Phe	Thr	Leu	Ala	Ile	Arg
	50					55					60				
Arg	Gly	Asn	Leu	Tyr	Leu	Glu	Gly	Tyr	Ser	Asp	Ile	Tyr	Asn	Gly	Lys
65					70					75					80
Cys	Arg	Tyr	Arg	Ile	Phe	Lys	Asp	Ser	Glu	Ser	Asp	Ala	Gln	Glu	Thr
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Val	Cys	Pro	Gly	Asp	Lys	Ser	Lys	Pro	Gly	Thr	Gln	Asn	Asn	Ile	Pro
			100					105					110		
Tyr	Glu	Lys	Ser	Tyr	Lys	Gly	Met	Glu	Ser	Lys	Gly	Gly	Ala	Arg	Thr
		115					120					125			
Lys	Leu	Gly	Leu	Gly	Lys	Ile	Thr	Leu	Lys	Ser	Arg	Met	Gly	Lys	Ile
	130					135					140				
Tyr	Gly	Lys	Asp	Ala	Thr	Asp	Gln	Lys	Gln	Tyr	Gln	Lys	Asn	Glu	Ala
145					150					155					160
Glu	Phe	Leu	Leu	Ile	Ala	Val	Gln	Met	Val	Thr	Glu	Ala	Ser	Arg	Phe
				165					170					175	
Lys	Tyr	Ile	Glu	Asn	Lys	Val	Lys	Ala	Lys	Phe	Asp	Asp	Ala	Asn	Gly
			180					185					190		
Tyr	Gln	Pro	Asp	Pro	Lys	Ala	Ile	Ser	Leu	Glu	Lys	Asn	Trp	Asp	Ser
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Val	Ser	Lys	Val	Ile	Ala	Lys	Val	Gly	Thr	Ser	Gly	Asp	Ser	Thr	Val
	210					215					220				
Thr	Leu	Pro	Gly	Asp	Leu	Lys	Asp	Glu	Asn	Asn	Lys	Pro	Trp	Thr	Thr
225					230					235					240
Ala	Thr	Met	Asn	Asp	Leu	Lys	Asn	Asp	Ile	Met	Ala	Leu	Leu	Thr	His
				245					250					255	
Val	Thr	Cys	Lys	Val	Lys	Ser	Ser	Met	Phe	Pro	Glu	Ile	Met	Ser	Tyr
			260					265					270		
Tyr	Tyr	Arg	Thr	Ser	Ile	Ser	Asn	Leu	Gly	Glu	Phe	Glu			
		275					280					285			